

## Are Physicians Distributed Equitably in Canada?

### Not Just a “Head Count”

The geographic distribution of physicians is a major health care issue. Those making decisions in the planning of health services want to know how many doctors are needed in a given area and how far short of this the current numbers fall.

For developed countries, including Canada, there is a general belief that the overall supply of physicians is adequate but that there is an uneven distribution of physicians, with rural, small and remote communities having an inadequate supply. This has the potential to be particularly acute in Canada, where there is a vast hinterland with a widely scattered population. Research needs to pay special attention, therefore, to the distribution of physicians in rural and remote areas of Canada.

An uneven distribution of physicians raises concerns of equity and social justice, especially where there is a public health care system promising universal medicare. There is also concern that inadequate access to medical care will lower the health status of a population.

The most common figures used by researchers and by health services planners to determine where there are physician shortages are population-to-physician ratios. They are also the easiest to construct and to understand: simply divide the population in an area by the number of physicians in the same area.

For 1996, for example, there were 524 Canadians for every physician (family physician or specialist), an improvement over the 555 Canadians per physician a decade earlier.

Although these ratios are sometimes useful as general guidelines and serve as the basis for more elaborate and more meaningful indices, they may be misleading. The study of the supply of physicians is more complex than this, and needs to take into consideration such things as physician productivity, mobility of physicians and patients, physicians practising beyond the scope of their specialties, substitution by other providers, and the medical needs of the population. Many factors affect care-providing and care-seeking behaviours.

A more accurate description of the geographic distribution of physicians than straight head counts will be of greater value for developing effective programs and policies.

Various approaches to measurement have been used by other researchers. Using some of these approaches, singly and in combination, maps can be prepared to show the geographic distribution of physicians in Canada. A study of these approaches and mapping techniques will help other researchers and health service planners who have to grapple with the seemingly simple but in fact very complex issue of accurately describing the geographic distribution of physicians.

This issue of Research in **FOCUS** on Research is based on the CRaNHr study, *Geographic Distribution of Physicians in Canada*, by J. Roger Pitblado and Raymond W. Pong, commissioned and funded by Health Canada in 1999. The full report, in PDF format, is at [laurentian.ca/cranhr/onlrpts.html](http://laurentian.ca/cranhr/onlrpts.html); it can be downloaded in full or by chapter.

This study has led to the following publications: Pong, R.W. and J.R. Pitblado (2001). “Don’t take ‘geography’ for granted! Some methodological issues in measuring geographic distribution of physicians.” *Canadian Journal of Rural Medicine* 6(2): 103-112, and Pong, R.W. and J.R. Pitblado (2002). “Beyond counting heads: Some methodological issues in measuring geographical distribution of physicians.” *Canadian Journal of Rural Medicine* 7(1): 12-20.

## What Does Other Research Tell Us?

Researchers in both Canada and the U.S. — where there are similar concerns over responses to unequal access to medical care — have used various methods to describe the geographic distribution of physicians. Their results are reported in government and agency studies as well as academic journals.

Two different approaches have been taken to overcome the inadequacies of straight head counts.

In the first, more traditional approach, researchers have attempted to clarify and measure more accurately the three variables in the population-to-physician ratios: the *geographic area*, the *number of physicians*, and the *number of people*.

► Several statistical and administrative units have been used as *geographic areas* for population-to-physician ratios. Unfortunately, administrative areas (e.g., province, county, census division) are artificial and not necessarily the most appropriate for describing medical care provision. They also change over time. The problem is compounded by the fact that some patients and physicians travel outside administrative areas to seek or deliver care.

If a geographical unit is small, the ratios can be distorted by geographic mobility; if large, regional differences may well be masked.

In order to compare physician supply in rural areas with that in urban areas, we must first determine which geographical areas can be described as “rural.” This is not an easy matter (*see box*).

► A head count of *physicians* is relatively easy because all physicians must be registered. It is harder to find out what physicians do and how much they do. What matters to researchers and planners is how much is produced in the way of clinical services. A head count usually does not take into consideration non-clinical work (e.g., research, administration, teaching) by physicians, varying activity levels (studies show that the hours worked by physicians has gradually declined over the past two decades), or the influence of age and sex on physicians’ workload (women

physicians and those nearing retirement tend to work fewer hours). Distortions to the ratios can also result from the fact that many physicians do not limit themselves to their declared specialty. For example, rural family physicians might perform procedures that would be done by specialists in urban centres.

In an attempt to reduce such distortions, researchers increasingly count full-time-equivalent (FTE) physicians instead of “warm bodies.” While 16.8% of Canada’s physicians are in rural areas, 18.2% of the FTE counts are in rural areas (which suggests that rural physicians work longer hours than their urban counterparts). But FTEs are difficult to determine from existing data. More work is needed on this.

► For the *people* part of the ratio, what matters more than straight population numbers is the people’s need for medical care and how they use medical services. Adjustments to ratios are recommended to reflect factors such as age, sex, health status, morbidity and utilization patterns. Not all of these data are readily available.

In the second approach, some researchers — considering access as the main concern — have preferred to avoid the need to define a geographic area altogether. Instead, they describe the distributions of physicians and population in terms of distances between potential patients and physicians. They have examined distance to a family physician, distance to a specialist, distance from a family physician to a specialist, and distance to a hospital. Distance has been calculated in several ways: straight line, driving time, travel cost, etc.

Various sets of guidelines for minimum time standards have been recommended: e.g., 30 minutes to primary care, 2 hours to secondary care.

Difficulty of access to physician services is not always simply a matter of distance.

Some combination of refined ratios and refined distance

measurements might lead to a more accurate and more useful determination of the geographic distribution of physicians in Canada.

### ► What is “rural”?

There are almost as many definitions of “rural” as there are researchers. Even within a single agency there can be a lack of consensus; and the definitions are not constant over time. Each definition has its attractions and limitations. Rurality has varying degrees, as well, that need definition. It may not even be feasible to search for one all-purpose definition of “rural.” This report looks at several definitions in common use and chooses for its own purpose the Statistics Canada definition of rural and small town Canada, e.g., the population living outside the commuting zones of larger urban centres, especially Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs).

### ► What is a physician “shortage”?

Uneven distribution of physicians is readily apparent from the numbers and easy to map, but this does not necessarily identify shortages. A shortage, or maldistribution, can only be determined through comparing a ratio with some ideal ratio or at least with an established norm. Unfortunately, there are as yet no universal standards. Existing national standards may or may not be applicable to smaller geographic areas. Research is, however, helping us to become better able to identify shortages. Work is ongoing to refine population-to-physician ratios in light of many variables and to come up with guidelines that reflect these variables. In other research, various indices have been devised to measure deviation from established norms.

# Where are Canada's Physicians?

*Where do Canadian physicians practise?  
How far away are they from the people they serve?  
How far away are they from their colleagues?  
What, if any, changes in these patterns have occurred over the period 1986 to 1996?*

Guided by insights gained from the literature review, we can use tables and maps to address these questions. Simple dot maps can show the practice locations of physicians. For example, the map on page 4 uses one dot for each of the 54,958 physicians practising in Canada in 1996.

Maps can also show the important comparisons between the spatial distribution of physicians and the spatial distribution of the population.

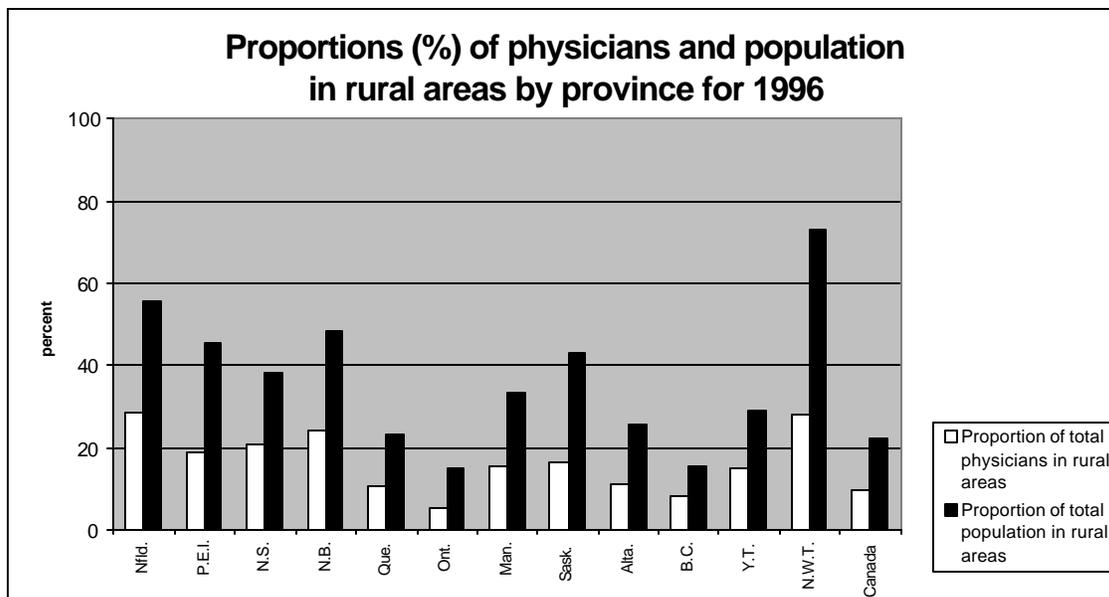
Finally, maps can explore combining data from population-to-physician ratios with distance measurement data. Although current attempts are limited by the arbitrary nature of ratio limits and straight-line distances, they form a basis for more detailed work using computer mapping (GIS) techniques and new data that are becoming available.

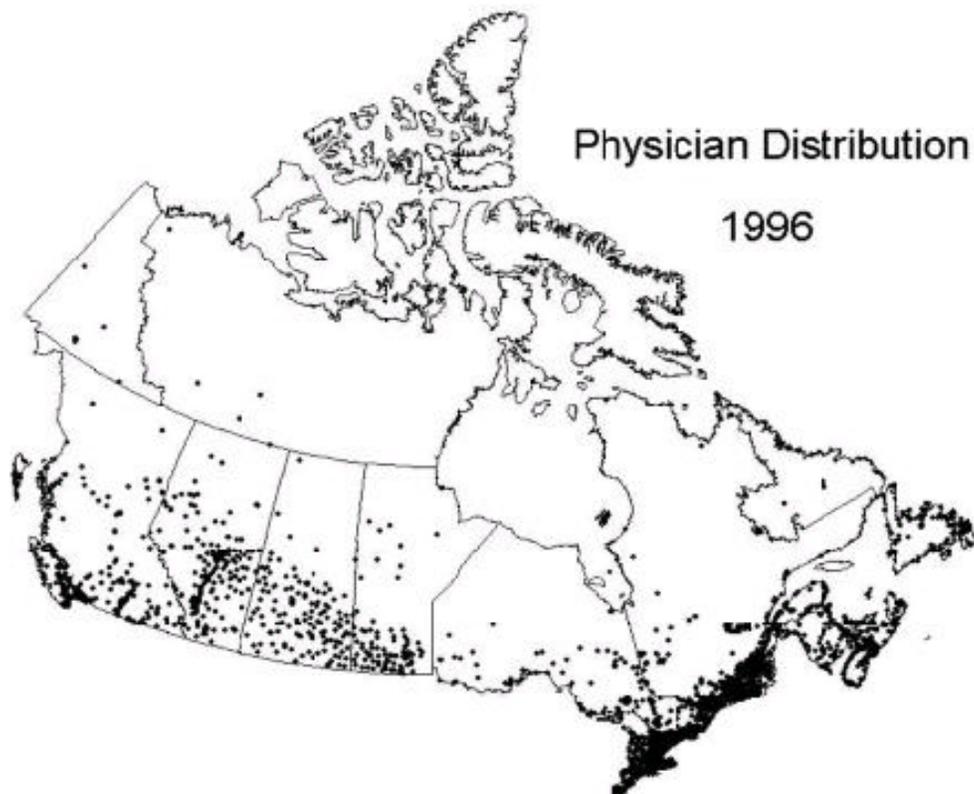
## What our research shows

- ▶ From 1986 to 1996, the number of physicians in Canada increased by 20.5%, while the overall population grew by only 13.9%.
- ▶ "Head count" ratios of population to physician improved over that period, and the recommended ratios for family practitioners and most specialists were met at the national

and provincial levels. Ratios of population to physician based on full-time equivalents also showed improvement, but met fewer recommended ratios.

- ▶ Despite the improved "head count" ratios, regional variations continue to show an uneven distribution of physicians in many parts of Canada. In particular, there were decreases in the numbers of rural physicians relative to the population in rural areas (see the figure below). From 1991 to 1996, the proportions of physicians working in small town and rural areas of Canada decreased from 14.9% to 9.8%, while the rural population fell from 29.2% to 22.2% of the total Canadian population.
- ▶ The uneven distribution is particularly acute with respect to specialist physicians in rural and remote areas.
- ▶ If female and older physicians continue to become an increasing proportion of the physician workforce, it will be more difficult to reach the recommended ratios.
- ▶ While 86.8% of Canadians live within 5 km of physicians and 67.3% live within 5 km of hospitals, rural residents must travel increasing distances for health care because physicians and hospitals are increasingly concentrated in urban areas.
- ▶ Where existing administrative units are used, the Statistics Canada urban/rural codes are highly recommended for showing the urban/rural differences in the distribution of population and physicians.





## The Next Steps

The study of the geographic distribution of physicians has evolved from simple counts and population-to-physician ratios to something that is more complex – but that leads, at the same time, to greater clarity of concepts, more precise measures and more sophisticated indices.

The goal is to develop measures that reflect as accurately as possible both the medical care needs of a population and the capacity of available physician resources to meet those needs. But researchers are only part way along the road to developing such measures.

There are specific areas where further research would help in the development of more accurate measures: provider substitution; the definition of “full-time equivalent;” the measurement and concepts of distance in terms of access; the potential impacts of telemedicine; and the complex inter-relationships between physician availability, utilization by the population, and health status of the population. None of these gaps can be filled without a significant increase in reliable, relevant data.

Such research may make it possible to determine with more confidence an ideal distribution of physicians, and then to identify more accurately areas where there are physician shortages, as well as the severity of those shortages. This could lead to a more equitable distribution of physicians in Canada.

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